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PELVIMETRY FOR THE GENERAL
PRACTITIONER.

BY

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OF BALTIMORE.



FROM
THE MEDICAL NEWS,
March 21, 1891.

[Reprinted from THE MEDICAL NEWS, March 21, 1891.]

**PELVIMETRY FOR THE GENERAL
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THE subject of pelvimetry, important as it is, is usually totally neglected in most of our medical schools, and any knowledge that the practitioner has of the subject he has been obliged to glean for himself. And he receives but little encouragement to pursue its study when he reads Lusk's statement that in our native American women abnormal pelves are rare, and hears physicians of experience state that in thousands of cases they have never met with a single deformed pelvis; though they will willingly admit that they have performed craniotomy on numerous occasions.

Of course, these statements apply only to those marked cases of deformity which no one could fail to recognize after a most casual examination.

While the extreme degrees of deformity may not be as frequent here as in Europe, still they do occur, and that often enough for us all to be on the lookout for them.

These, however, constitute only a small portion of contracted pelves; and through our neglect of pelvic measurement we lose sight of the far more

frequent cases of moderate contraction, in which there is no absolute bony resistance to the passage of the child, but still resistance enough to make the labor most difficult and dangerous, or to cause such abnormalities in the position or presentation of the foetus that its delivery may become almost impossible. Michaelis called attention to this fact years ago, and stated that the evil effects of a moderately contracted pelvis were due, not so much directly to the bony resistance as to its effects upon the position and presentation of the child, and showed that transverse presentations occurred from four to five times more often, and prolapse of the cord alongside of the presenting head ten times more often, in contracted than in normal pelves.

In the German institutions, where pelvic measurements are an integral part of the conduct of each labor case, the frequency of contracted pelves—that is, pelves with a conjugata vera of $9\frac{1}{2}$ cm. ($3\frac{3}{4}$ inches) and less, was estimated at from 13 to 14 per cent., the general average being about 14 per cent. or one-seventh of all cases. Admitting that the ratio is somewhat smaller in America, which we cannot positively affirm, for, as far as I know, no one in this country has measured a sufficient number of consecutive cases to obtain reliable estimates, still we cannot afford to attend from one-seventh to one-eighth of our obstetrical cases in the dark and then talk of being skilful and scientific obstetricians.

History.—Our knowledge of contracted pelvis is of comparatively recent date; for to the ancients the condition was unknown and they believed that the child was born by its own efforts, aided by the mo-

bility of all the pelvic bones. It was not until the latter part of the sixteenth century that Aurantius first discovered the contracted pelvis as an anatomical fact. This knowledge was first practically applied by Deventer in the first part of the eighteenth century, who rather accurately described in his book, *A New Light for Midwives*, the principal forms of contracted pelvis, namely, the justo-minor and the flattened, and their effects upon the mechanism of labor, and upon the foetal head. In the middle of the eighteenth century flourished the great Smellie, who not only recognized the deformity and its effects but was the first to estimate the conjugata vera by measuring manually the conjugata diagonalis, and who recorded cases in which the antero-posterior diameter was not more than one and a half inches. At the end of the century, Baudelocque introduced the external methods of pelvic measurement. He placed the greatest reliance on the external measurements, especially on the external conjugate, which he discovered, and from which he believed he could calculate the conjugata vera with almost absolute exactness, his results only varying a few lines.

These three men laid the foundations for the doctrine of contracted pelvis and pelvimetry; but the honor of placing the subject upon a scientific basis must be ascribed to the famous obstetricians of Kiel, Michaelis and his successor Litzmann. These two measured the pelves of all the cases that came under their care and were thus able to study the numerical proportion of contracted to normal pelves, thereby showing that contraction was far more frequent than

was generally supposed. By accurately observing the mechanism in these cases, they were able to present the subject in so clear and so exhaustive a light that they are still our standard authorities.

Since the time of Michaelis nearly every Continental obstetrician of prominence has devoted considerable time to the subject, without, however, adding much of real importance to the able work of his predecessors, while we, on the other hand, have allowed the subject to fall into almost total neglect.

Aims.—The scientific obstetrician naturally aims to learn all that is possible about the deformity in each case, and will put himself to considerable pains to determine exactly what form of contracted pelvis he has before him, and exactly how and to what extent it is contracted. To do this requires special training and practice, such as the general practitioner is not supposed to possess and which naturally cannot be demanded of him. But he should be expected to recognize the ordinary forms, especially the generally-contracted or justo-minor, and the flattened rhachitic or non-rhachitic pelvis, and should be able not only to recognize the species of deformity, but also approximately to estimate the amount of contraction, especially in the antero-posterior direction. Indeed, on account of the rarity of the other forms of contraction and the extreme difficulty in estimating the other diameters and the varying results of different methods, pelvimetry for the general practitioner resolves itself into recognizing a flattened pelvis and estimating the conjugata vera.

Methods.—Pelvimetry may be divided into exter-

nal and internal methods; only the latter, however, being capable of giving anything like accurate results. External measurements, except by means of a pelvimeter—and almost any form will do—are utterly worthless, and even those made by means of a pelvimeter point only to the species of the deformity without giving definite information as to its degree.

The principal measurements of the pelvis are three in number:

1. *Distantia spinarum*—the distance between the anterior superior iliac spines.
2. *Distantia cristarum*—the distance between the most widely removed points of the iliac crests.
3. *Conjugata externa* or Baudelocque's diameter—the distance from the depression below the spine of the last lumbar vertebra to the outer surfaces of the symphysis pubis.

Of these, the first two are by far the most important, and they average 26 and 29 cm. ($10\frac{1}{4}$ and $11\frac{1}{2}$ in.) respectively. Mere variations in measurement are not of much importance, so long as the relative proportion between the two remains the same. The careful work of Scheffer some twenty-five years ago showed that the measurements do not justify us in drawing conclusions as to the transverse diameters of the superior strait, as was formerly supposed. Scheffer showed that with equal external measurements, the transverse diameter of the superior strait might show a difference of 3.3 cm. Skutsch has lately verified these results.

While these measurements do not give the much desired transverse diameter, they do give us much

valuable information as to the shape of the pelvis. If, for example, in connection with a shortened conjugata vera, both the measurements are markedly decreased, but still retain their relative proportion to each other, we are justified in concluding that we have to deal with a generally-contracted pelvis.

In the rhachitic pelvis, this relation between the spines and crests vanishes, and the distantia spinarum increases at the expense of the distantia cristarum, and may even exceed it, according to the extent to which the iliac bones are flared out. In this latter case, of course, the distantia cristarum cannot be measured in the usual way, and to obtain it we measure the crests at a point from 6 to 7 cm. behind the spine.

In the simple non-rhachitic flattened pelvis we do not get this increase of the distantia spinarum at the expense of the distantia cristarum, for the iliac bones are not flared out, as in the rhachitic form. Baudelocque's diameter may be dispensed with by the practitioner, for the researches of Michaelis, Crede, Schröder, Dohrn, and Skutsch show that it is not nearly so exact as its originator considered it when he stated that, by deducting three inches from it, he obtained the vera with great accuracy in thirty-five cases, his results differing only a line.

This diameter varies in the living from 16 to $23\frac{1}{2}$ cm. ($6\frac{1}{2}$ to $9\frac{1}{2}$ ins.), with an average of about 20 or 21 cm. (8 to $8\frac{1}{4}$ ins.), and to obtain the vera the average amount to be subtracted is 9.2 cm. ($3\frac{1}{2}$ ins.). But the results vary so much that they cannot be relied upon, and the most that we can say is that a Baudelocque's diameter of less than 16 cm.

(6.4 ins.) indicates a contracted pelvis in nearly all cases; less than 18 to 19 cm. (7.2 ins.) in about half the cases; while one of more than 20 to 21 cm. (8 ins.) rarely does so.

Internal methods.—The main point of importance for the general practitioner is the estimation of the conjugata vera, and for its determination many methods have been devised. All the instrumental methods leave much to be desired, for they are always inaccurate or cumbersome, or both. And all methods for measuring the vera directly with the hand are inaccurate, and require for their performance the introduction of the whole hand into the vagina. So, from a practical point of view our chief reliance must be placed upon its estimation from the conjugata diagonalis; that is, the distance from the promontory of the sacrum to the lower margin of the symphysis pubis or the ligamentum arcuatum. To measure the diagonalis, the patient is placed in the dorsal position, and, if in bed, a small pillow is placed under her hips, so that the forearm of the examiner may be depressed to the proper position; then the index and middle fingers of the left hand, lying one upon the other, are introduced into the vagina, while the remaining fingers are folded against the palm of the hand and serve to press up the perineum. Then the forearm is depressed, and we attempt to reach the sacral promontory; having reached it, we press the ulnar side of the tip of the middle finger against it and retain it in this position, while with the radial side of the same hand we press hard against the lower margin of the symphysis. Then with the finger-nail of the index

finger of the right hand we mark the point at which the ligamentum arcuatum touches the measuring finger. The distance from the tip of the middle finger to this mark gives the desired measurement.

This method, by a little practice, gives almost perfectly accurate results—accurate within $\frac{3}{4}$ mm. Knowing the diagonalis, it is easy to estimate the vera by subtracting from it a given sum— $1\frac{1}{2}$ to 2 cm. (three- to four fifths of an inch). The amount to be subtracted varies under different circumstances, as will be readily understood when we consider our measurements as forming a triangle, of which the conjugata vera and the diagonalis form two sides and the symphysis the base. It will then be readily seen that, with an increase in height of the symphysis, the diagonalis becomes longer in proportion to the vera, and, consequently, the amount to be subtracted is increased. More important than this, however, is the inclination of the symphysis, or the angle it forms with the conjugata vera, for it is readily seen that the greater this angle becomes the longer becomes the diagonalis, and the greater the amount to be deducted to estimate the vera. In general terms, then, the higher and more perpendicular the symphysis, the greater is the amount to be deducted from the diagonalis—ordinarily a little more than $1\frac{1}{2}$ or $1\frac{3}{4}$ cm. (three-fifths of an inch) in normal and generally-contracted, and 2 cm. (four-fifths of an inch), or a little less, in flattened pelves. This method gives excellent results in lying-in women, and is readily applied in the non-pregnant, especially if multiparous, though it is usually more or less painful.

In non-pregnant women with lax abdominal walls we may employ the so-called external direct method to which Credé and Hardie called attention some years ago, and which Dr. H. A. Kelly is now engaged in studying and testing.

In this method the woman is placed on her back and the abdominal walls gently pressed in by the tips of the fingers of the left hand, till the tip of the middle finger rests over the promontory; then the palmar surface of the hand is brought down upon the symphysis, and with the finger-nail of the right index-finger we mark the point at which the palmar surface crosses the upper surface of the symphysis. This distance, without making any deduction for the thickness of the abdominal walls, represents the *conjugata vera* with tolerable exactness—within from $\frac{1}{2}$ to 1 cm.—and affords a ready, accurate, and convenient method of measurement for gynecological cases and in the early months of pregnancy.

With these comparatively simple methods at our disposal, I do not consider that we are justified in attempting to conduct a labor case in which there is the slightest possibility of the existence of a contracted pelvis, without measuring the pelvis before proceeding to any action whatsoever.

Indeed, I do not think Fritsch was far wrong when he said “that the physician who would conduct a pathological labor case without mensuration is as inexcusable as he who does not examine the urine when œdema is present”; or Dohrn, who says “that the physician who does not measure the pelvis is comparable to one who diagnoses

heart and lung troubles without the aid of auscultation and percussion." Such being the sentiments of these eminent men, it certainly behooves us to receive them with respect and to attempt to follow their advice. To attain results worthy of attention, practice in the art is absolutely necessary, and the only way by which we can attain the requisite skill is by taking every possible opportunity to measure the pelvis. I would therefore advise all who wish to raise their obstetric work above the level of mere midwifery to make it a part of the routine of the first obstetric examination, in every case, to measure the conjugata diagonalis, and from it to estimate the vera; and if it be at all contracted, to take the external measurements, especially the distantia spinarum and cristarum, and from these three measurements attempt to determine the species, and, roughly speaking, the degree of the deformity.

Anyone who will regularly pursue this course will be amazed to find how many moderately-contracted pelves do exist, and will then be able to explain in a rational way many difficult cases of transverse and other presentations, which previously he merely turned or delivered by forceps or cranioclast, and whose abnormal presentation or mechanism he ascribed to some freak of nature rather than to a rational and sufficient cause.

Of course, the practical man may object that what we gain by this is the mere satisfaction of a scientific explanation for hitherto inexplicable facts, and say that it is all well enough for those who pretend to be scientific, but to the practical, every-

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day man it is useless and not worth the time consumed.

If this were all that we gained from pelvimetry, I contend that it would still be worth the trouble. But this, while important, is only a small part of what we gain. What we really gain is a correct diagnosis and prognosis, and with these made, treatment follows as a matter of course.

What has been said of the results of pelvimetry in moderate contraction applies far more forcibly to those cases in which more marked contraction exists. For in these cases the results of measurement should be almost our only guide to correct treatment, and should decide for us whether we are to propose Cæsarean section, resort to forceps or version, or allow nature to take its course. With a pelvis of $5\frac{1}{2}$ cm. ($2\frac{1}{4}$ in.) or less, we have an absolute indication for Cæsarean section, for it is attended with as little or less danger to the mother than craniotomy, not to speak of the great gain of saving all the children if resorted to at the proper time. In pelves between $5\frac{1}{2}$ to $7\frac{1}{2}$ cm. ($2\frac{1}{4}$ to 3 in.) we have the relative indication for Cæsarean section—that is, we must offer our patient the choice between it and craniotomy, with the chances in favor of Cæsarean section.

If we measured all our labor cases, would we not more frequently than now discover those requiring abdominal section and promptly institute the proper treatment, instead of waiting till the woman has been in labor many hours, or perhaps days, and, after having exhausted her by numerous attempts at forcing delivery, to propose a capital operation?

It is the neglect of making a correct diagnosis that makes our Cæsarean section statistics so much inferior to those of our German confrères: I am confident that very few of us are willing to admit that it is due to inferior operative skill on our part. It is entirely due to the fact that most of our operations are done on exhausted or practically dying women who naturally cannot be expected to recover; while the Germans determine on the operation before labor sets in, or certainly after the first examination, and do not allow the case to go on blindly.

What has been said about the Cæsarean section applies with equal force to the induction of premature labor; and there can be no possible excuse for allowing a woman—after a difficult craniotomy, for example—to go on to full term again without measuring the pelvis and determining beforehand what should be done. With a pelvis of 8 cm. ($3\frac{1}{4}$ in.) and less, the operation is certainly indicated, and with our present aseptic methods should hardly be more dangerous than a normal labor, and far less so than the craniotomy that is sure to follow if the patient is allowed to go on to term.

I hope these remarks will lead some of us who have hitherto neglected this important part of obstetrics to take up its study; I am sure that, adding the estimation of the diagonalis to the ordinary obstetric examination in each case, they will be surprised to find how many pelves are contracted within moderate limits, and will occasionally find cases contracted to 8 cm. and less.

In these latter cases, unless the physician be a

skilful operator and is prepared to perform Cæsarean section under the strictest aseptic precautions, I do not consider that he does his duty to his patient if, when he has made his diagnosis, he does not immediately call in a competent specialist, who shall decide what is to be done. If an operation be decided upon, he will be able to operate upon a patient with the chances in her favor, instead of upon the usual exhausted and dying case.

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SCIENCES, monthly,	

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